Jerry Zhu

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Education

Stony Brook University — Stony Brook, NY
Bachelor of Science, Computer Science — *August 2022 - May 2026*

Technical Skills

Languages: C++, C, C#, GLSL, Common Lisp, Scheme, Java, Python, JavaScript, TypeScript
Libraries & Technologies: SDL2, Win32 API, OpenGL & WebGL, Unity, Godot, MonoGame, Emscripten
Developer Tools: Git, Mercurial, Visual Studio, GDB, Valgrind, RenderDoc, Bash, Trello, Linux

Projects

CrankLang | *C++* — March 2023 - May 2023

- Implemented a statically typed language supporting user-defined structures, enumerations, and multiple file modules with a **handwritten recursive descent parser** and compiler in **C++**
- Compiles programs from a type-checked and statically analyzed **abstract syntax tree**(AST) into **C++** code
- Implemented a constant-folding optimization pass by substituting parts of the AST if any sub-expression was considered constant (numerics or declared constant values)

Legends - RPG | *C, SDL2, Emscripten* — June 2022 - Present

- Utilized a **double ended stack allocator** backed by a fixed 16MB buffer. The stack is divided into permenant and level-only allocations allowing for the **elimination of dynamic memory allocations during runtime.**
- Implemented a **software renderer** with **tiled rendering** implemented through a **multithreaded job system** and **SSE** improving performance by 200% and allowing for post-processing effects such as bloom
- Implemented various **versioned binary formats** with an **endian-independent serialization system** (convert from host to little endian) for **backwards compatibility**, platform independence, and fast load times
- Designed a **save system** that is **delta compressed** to reduce both the memory usage of the system and save file size by omitting redundant data

Ascension - Action Platformer Prototype | *C, SDL2* — February 2022 - March 2022

- Implemented a **custom platformer physics engine** with support for **slopes** and **fixed timestep updates** to allow for more deterministic simulation behavior
- Developed a **particle system** with support for **physics interactions** with a **spatial partitioning scheme** to improve performance by reducing the set of collisions for participating particles
- Implemented Hollow Knight inspired gameplay mechanics such as 'pogo-bouncing', wall jumping and dashing

2D Game Framework | *C, OpenGL, SDL2, Emscripten* — July 2021 - October 2021

- Coded a **plugin system** for the game code through dynamic link libraries (DLLs) and a **custom build system** which allows the framework to link with game code either dynamically or statically with the same interface
- Implemented a **sprite batcher** with a packed 16 bit integer vertex format which increased performance by decreasing data-bandwidth for the GPU, screen-based **sprite culling**, and custom **shader support**
- Designed a configurable **glyph-cache** supporting **arbitrary Unicode text** with a fixed memory footprint. The cache is a hashset which invalidates if there are hash collisions
- Implemented development features such as a **Quake style debug console** and **hot reloadable assets**

Leadership

Software Development Team Lead — February 2021 - September 2022
The Environment Project — *Queens, NY*

- Led the development of Recyclopedia, a wiki web application with a **team of 4**
- Maintained and redesigned the organization **WordPress** website which reached **10K visitors**
- Authored the event page for the Flushing Meadows Corona Park clean-up which resulted in **111 participants**
- Managed collaboration through **GitHub** pull requests, **Trello**, and pair-programming meetings on **Zoom**